Synthesis & Next Steps

Design Sprint on Curriculum Alignment in Crisis Contexts

Paris, March 11-12th   UNESCO Headquarters

Google.org   LEARNING EQUALITY   Vodafone Foundation   UNHCR The UN Refugee Agency   Under the patronage of UNESCO — United Nations Educational, Scientific and Cultural Organization

OVERVIEW

Throughout the world educators need to be able to access relevant digital content aligned to national curricula. While there is an abundance of open educational resources, they are not often categorized against different national systems, or they are not organized in a way that facilitates self-guided discoverability. The process to do this is often time-intensive and remains a moving target, with additional digital resources in constant production.

To respond to this need, Google.org, Learning Equality, Vodafone Foundation, UNHCR, and UNESCO convened a sprint to develop proofs-of-concept for open-source software tools that can facilitate semi-automated curriculum alignment. Recognizing that many initiatives have been working on different facets of such tools, the sprint aimed to aggregate elements of varying initiatives, build cohesion among projects, and identify where there are still gaps to address.

> ## The basic question we explored:
>
> *How can we automate parts of the curriculum alignment process to make it easier to discover appropriate digital resources for our unique contexts?*

Through the sprint, teams identified potential methods that could address this challenge, support the role of human curators, and function as usable by a variety of platforms and projects. The projects focused on the following six topics:

- **Metadata -** examining design-based incentives to support the addition and maintenance of critical metadata to educational content libraries
- **Online Platforms -** using interoperable learning management platforms to customize and share learning pathways within different curricula
- **Standardization of Curricula -** exploring the curriculum digitization process and workflows for content recommendations based on curriculum alignment
- **Evaluation & Feedback -** exploring needs to leverage qualitative feedback, along with usage data, to provide more intelligent and insightful content recommendations and content reports for curriculum aligners
- **Teacher Training -** exploring how to support preservice and inservice professional development around the use of materials by supporting discussion and peer mentoring
- **Community Content -** exploring how communities could engage in being producers of aligned educational teaching resources

Participants

Each participant was invited due to unique experience and expertise working on a facet of this problem. **In total, 28 participants from 10 countries joined the sprint.**

The team was representative of curriculum development experts, developers, designers, and potential users, with representatives from groups which work on diverse aspects of this problem. Some included:

- Maintainers of organized digital repositories/libraries for education
- Specialists in recommendation and suggestion algorithms
- Creators of learning and content management systems

- Librarians and library scientists
- OER, open education, and open pedagogy specialists
- Curriculum designers and accreditors
- Ministry specialists in curriculum and learning goal-setting

Facilitation Team

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LEARNING EQUALITY
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  Kolibri Consultant

We were also joined by Kolibri experts from Kakuma camp, Kenya, who participated remotely, gave feedback, and created a project. The Kakuma Kolibri experts lead the program, facilitate the use of Kolibri, and co-design activities with UNHCR and Learning Equality for Kakuma camp.

- ● Aluong Agok
- ● Gabriel Anyang
- ● Byaruhanga Nestori
- ● Jayson Akilimali Mushagalusa

PROCESS

A design sprint is a high-intensity session intended to simulate an entire product or idea design cycle in a compressed fashion. **Drawn from Google's sprint methodology, this particular sprint encompassed four stages over two days, as well as a brief introduction to prior background on the project and previous findings.**

The high-level workflow, shown below, was derived from a human-centered design process, involving investigation into user needs, collective ideating, and the formulation of next steps and areas of interest within those ideas

EMPATHIZE　　**DEFINE**　　**IDEATE**　　**PROTOTYPE & TEST**
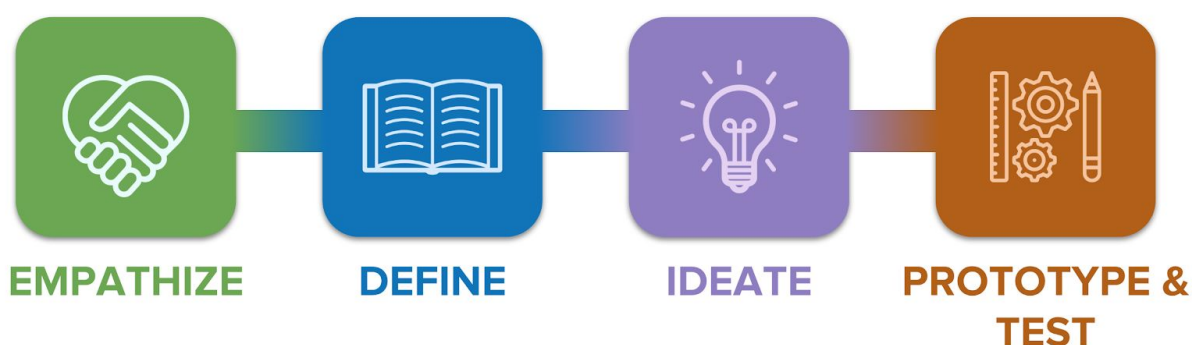
One of the goals of this collaboration was not only to reach the prototype phase, but to produce a common base for discussion and future reference throughout the empathizing and defining stages: establishing a common language of terms, ideas, problems, and dilemmas in the curriculum alignment space, especially those common to all types of projects. In the following section, we present outcomes at each stage of the process as contributions to this endeavor.

Following the Process

Stakeholder Interviews

The empathizing stage began with a round of interviews from stakeholders in the room who represented six key facets of the process: **content mappers, curriculum creators, learning platform designers, library creators, ministry, and teachers or coaches.**

In previous consultations, we determined that each of these stakeholders plays a vital role in the process of curriculum alignment, and participants took the opportunity to understand both their needs and the previous work they have done on this subject. We've reproduced the interviews here in full, finding them useful additions to common discussions about curriculum alignment for future projects.

1. Ministry | Dr. Nouh Alhindawi, Ministry of Higher Education, Jordan

Q: *How much preparation does the teacher have to do? Where do they list their curriculum?*
A: Course materials are prepared beforehand; teachers do not contribute or decide what is included, but can download and customize it. If teachers want to use something extra, they can. But they must teach the standard

syllabus. An expert committee including teachers decides on the content.

Q: *To what extent is OER part of the ministry's policy and strategy? Are the courses open to people outside the public system?*
A: OER in Jordan is based on the King's request to build a platform for all ed resources. Established center for OER, as an umbrella for all to distribute courses at all levels. Courses will be built by the ministry and uploaded to the platform.

Q: *What is the pedagogical model?*
A: Varies from one course to another, e.g. in math, you need many videos, but in healthcare, might require fewer. Depends on the vision of the instructional designers.

Q: *Who do you see as the main stakeholders to deliver education to refugees? What is your expectation for coordination?*
A: Universities in Jordan, UNHCR. Separate login on the platform for refugees, they study with many different providers and do not standardize. Our goal is to coordinate all activity regarding education across the ministry. We don't want any partner to go individually to make a course.

Q: *Do they have good internet in the camps?*
A: Eutelsat is working on providing connectivity in the camps.

Q: *If anyone wants to teach Syrian refugees, can they teach the Syrian curriculum?*
A: No, they need to teach the Jordanian curriculum.

Q: *How do we fix this challenge?*
A: There must be a connection between the Ministries. Most refugees are in school now. We have 7000-8000 refugees in university now, and younger children who come in enroll in Jordanian schools or private schools.

Q: *In K-12 education, what is the status of OERs?*
A: We have Queen Rania Foundation, EDRAAK, working on building courses as OERs. For K12, we are going to start with English, mathematics, and Physics. It is online material, but the teacher gives face to face instruction. Students can use the material from home as well.

Q: *Is this the model for all schools?*
A: Yes, our strategy is to put all courses and course materials online. This will be mandatory, teachers must get their material from the website. EDRAAK is supplementary material at the moment. We have a problem in Jordan, that most students have their private tutors after school. Our goal is to minimize this to support standardization.

Q: *What is the phasing of this project?*
A: We have a meeting this week about how to build the infrastructure into all schools in Jordan to access our platform. We will implement for the whole grade level in regions that have the equipment. There is a program to train teachers on how to use the system.

2. Library Creators | Dr. Lisa Petrides, ISKME

Q: *What do you define as an educational library?*
A: Libraries which work mostly with Open Educational Resources.

Q: *How do you combine the content? Do people give it to you?*
A: Only OER for the time being. People add and adjust content using standards, mostly LTI.

Q: *Architecture of the different libraries--how does it work?*
A: Often, not so much an exchange of content as a metadata exchange.

Q: *When did you start diversifying the number of libraries? When you received a certain amount of funding? When the number of libraries grew?*
A: People came to us and said, "We don't even care about your content, what we want is the service, the curation."

Sometimes people wanted taxonomy, sometimes commercial content integrated with the OER content. Most stakeholders don't want a teacher to have to go to three different places to find the content they need.

Q: *Why are certain languages picked? Sponsors? Stakeholders?*
A: General understanding of open is "anything I can get to via Google". Try to be as inclusive as possible and as agonistic as possible. Lots of people don't want to use the CC license, the noncommercial license is not necessarily well defined "It's kind of a mentality--if you don't use the license." Most people who use education content don't know or care about the licenses.

Q: *How do these open values influence the structure of your library? Especially in contrast to a commercial* *library--how does the interface different? How is this library different because it's an educational system?*
A: Metadata definitions, design, interface: all designed with educators in mind. How you define material types, grade level, etc. Always have had 2-3 metadata specialists on site. Lots of cross-mapping and cross-walking of standards across. Standards-agnostic in order to be ambassadors of the content. Automated harvesting of metadata from content partners. Probably have at least 10 different ways to ingest their metadata. Looking into endorsements. Endorsing others' work and also endorsing collections of content

3. Learning platform creators | Dr. Richard Tibbles, Learning Equality

Q: *Who does building curriculum and filing the gaps, is it done at the ministry level?*
A: NGO level; e.g. our partners in India create aligned channels implemented in 100+ schools.

Q: *Does that mean there is certification from the ministry?*
A: Depends on country. In India, government sign-off for content is not needed; in Kenya, curriculum is defined by KICD. Content is currently being mapped to Kenya curriculum and going through the Kenya approval process.

Q: *Do special group of people in the NGO do the matching? Is there a separate group of people doing* ***certification?***
A: Yes, usually different groups. It depends on the country.

Q: *How many countries are you working in?*
A: We've been working with implementation partners in India, Mexico, Uganda, Tanzania, Jordan, Cameroon, Kenya, South Africa, and our device fund grants support new partners in 29 countries. Our software is free and open source, so we've seen grassroots Kolibri installs in 140 countries.

Q: *Is Kolibri just an educational resource platform or also an LMS?*
A: Kolibri has aspects of LMS like user accounts, groups, lessons, and classes. The assessment items come from the content library. We also have tools for teachers like dashboards, which allow teachers to see what parts students are struggling with.

Q: *Is user data only stored locally? How do you track students?*
A: For now student data is stored locally to the Kolibri server. We have capability to export and sync analytics too, but not turned on by default. We're currently building infrastructure to receive this data. We track student's progress an answers on assessment items. For viewing, we just record how far they went through the content and the time spent.

Q: *Do you track learning behaviour to know the quality of the content?*
A: Not started, but data sync is part of that.

Q: *How can teachers evaluate the materials?*
A: We hear some feedback from partners, but more independent evaluation would be useful.
For example, in India the question types on the state board exam differ from the KA question format so our partners uploaded many exercises to better prepare students for these exams.

Q: *How do you do the metadata, and at what level of granularity? The more granular the content, the more work it creates for teachers to prepare lessons.*
A: One thing we face is variability in "size" of content items. Textbook = 100+ pages vs. video which is 5 mins. In general, we try to make as granular as possible, e.g. split books into chapters and sections. There is potential for automation to help with this. For example if teacher chooses on element out of a lesson with 12 parts, we can suggest the remaining 11 parts. It's better to be granular since it allows more customization, e.g., add certain content items for supplementary or remedial use instead of being limited to entire pre-packaged lessons.

(The discussion then changed to the topic of multilingual content and multilingual instruction, using the specific case of Lebanon as the example) In Lebanon, material is taught either in EN or FR, but generally not in Arabic, and teachers need to add Arabic explanations for refugee learners. Content needs to be bilingual, either EN+AR or FR+AR. How to represent multilingual content within the learning platform? Do we need to apply two language codes `en+ar`/`fr+ar` or just a apply the `mul` language code and handle with tags? Special interface for parallel-texts? Producing language-agnostic content templates that teachers "fill in" with explanations in the target language.

Q: *Do you want to put in gamification?*
A: We have points. That's the limit of how far we've gone so far. We're taking a cautious approach, to avoid encouraging behaviours that are not helpful for learning (e.g. blindly clicking on items to score points).

Q: *What about the achievements, keeping track in a central place. [These] could lead to some certification?*
A: Yes, that's where alignment to some skill-based curriculum could be good. Or keystone achievements that tie to official curriculum, or part of a certification. Identifying those needs should come out of curriculum alignment.

Q: *[You could] decide not to do [certification], and just focus on bringing content.*
A: Yes. We don't want to do "official" certification, but it could be good to suggest to learners "you're ready to get certification for these skills." That's where curriculum alignment comes in.

Q: *How do you bring online resources to offline?*
A: We focus on bringing content and adapting it to the Kolibri platform. See example of import scripts here. Sometimes we cannot reproduce all features from the source learning platform, but this is rarely a problem since many platform features have an equivalent in Kolibri, e.g., lessons to do differentiated instruction.

4. Implementers and Interviewers | Kakuma refugee camp coaches

Four Kolibri Experts participated via video conference to help provide insights into the learning environments in Kakuma. All of these experts have previously been teachers and work to train and mentor the local community on how best to leverage platforms like Kolibri to support their learning goals.

Q: *What does a typical day at a school look like in Kakuma?*
A: In Kakuma, there are few secondary schools, which means the schools function in a two-schools in one model. One set of students arrive for the morning session and the second set arrive to take classes in the afternoon thereby maximizing the available classroom spaces. Although classrooms are still extremely crowded with minimal resources. Just like other government supported schools, in the Kakuma Refugee Camp, a teacher always begin his day with a lesson planning session followed conducting a series of lessons before the half day dedicated school A is over. Then they carry out diligently their duties, professionally interacting and attending to lower achievers, as well as helping the high achievers to keep up their good work. It's typically a busy day that requires the flexibility of the teacher in terms of using effectively the inadequate resources that are available, while also supporting the two schools in one strategy with high number of students.

Q: *Do teachers in refugee camps have access to the curriculum?*
A: Some teachers have access to the national curriculum, but often the main resource is government approved textbooks. There are minimal textbooks for students and teachers to use in the classroom, and in general learning resources are extremely scarce.

Q: *Do students support the role of the teacher?*
A: Students highly support the role of the teachers by doing all the task that their teachers assign the class. For instance making notes and doing research on certain topics they're given or working on the assignment. The students do trust their teachers as their second parents so they do expect everything about teaching to be done by the teacher, as that is the culture here.

5. Content and curriculum mappers | Wanjira Kinuthia, UNHCR Consultant

Wanjira was formerly teaching instructional design courses at Georgia State, and used a lot of OER in her curriculum development work. Last summer, she did work mapping the content in Kolibri to the Kenyan curriculum with UNHCR, Learning Equality, and KICD. This was focused on resources for Form 1 and 2 (9th and 10th grade), on the subjects of math, chemistry, physics and life skills.

Q: *Was this process automated, or manual?*
A: Mostly automated, or semi-automated, with tools from Kolibri. Then more manual searching for lessons outside the platform. Then built spreadsheets.

Q: *Did you start with sample of resources, and generalize from there?*
A: Started with KA and used ministry standards. Math might have 32 topics with unique objectives to cover. Went through each topic to find things that matched the topic. When I didn't find something, I went outside. Part of the job was to see what's available and where it fits.

Q: *When you couldn't find something available to map to the curriculum, what was your process like in Googling?*
A: There are fairly universal areas. Math is math. All that changes is how that's delivered. Might find something that could be used in a math class, but doesn't quite match the grade level. But way it's designed/delivered, be it video, text, html, I would go through to see whether it's "close enough" to what we want, in terms of level. Wanted to avoid using resources that don't fit the context. A bit of a challenge, would find something, then realize, oh, this is college. Would search or browse through Studio, when didn't find, would go through Creative Commons, or the libraries themselves. Advanced google search by license. Focus on free-to-use. That takes me to the source, I can then look what else is available there.

Q: *Do you go through all of the content available [on the platform]?*
A: Yes, I did. I'm not a math teacher, but could make recommendations, then push it back to the teacher, to make sure she has math/content experts to make sure it's actually at their level.

Q: *If there was so much content that you couldn't go through it, what would you do?*
A: That's where automation comes in. I started with what I could work with in the time I had. Because I was doing 8 areas, I would split my time. For each lesson, try to create a balance. Don't have to import everything, which could be uncomfortable for a teacher. Narrow down resources--30 would be too many. If I have a certain objective that needs to be covered in a certain way, just find one example. In the end, there wasn't always a balance, some had more, less for life skills, which is more context-based. For the refugee communities, they were living in Kenya, but culturally not from Kenya, so some examples might not work, so lots of gaps.

Q: *You mentioned not having resources. Is that more aligned to the topic, or the area.*
A: Topic and the level of the topic. I found a lot more resources for higher ed than for younger grades. Not much available for age range. Primary school. We're not creating as many resources in Kenya as we could, many are coming from the US, so more specific to that context. e.g. baseball. Examples weren't great. Finding universal or general examples would be good.

Q: *How did you learn what keywords to use when searching?*
A: Working on project at University in West Indies. Tried to use a session like this to map resources for higher education. Found ways to start with meta-search and advanced search. Went back to these techniques. When these terms can't be found, what are some alternative terms? Find the closest terms.

Q: *What were the most tedious / annoying parts of the process; the parts that made you ask "why am I doing this"?*

A: Finding the ideal keywords was tedious. And educating yourself on the particular topic. Once you have the information, it's easier. The repetitiveness of it was tedious, going through each learning objective. If there was a way for the standards to be entered into the platform, that would help. But it would have to know about all these different standards.

Q: *How to deal with subjects across education systems, when searching?*

A: In past as instructional designer, don't have to know everything, work with people who know the content area well, have them tell what's most important. Have worked with people in finance/economics, to guide her that they're on the same path.

Q: *Do you collaborate with others doing same thing?*

A: To avoid redundancy, project aren't always exactly the same, they're linked, but not exactly. Someone else doing a different level of the work. Really defining the jobs, knowing what each one does.

6. Curriculum Creator | Judy Muriuki, Kenya Institute of Curriculum Development

Q: *What are your main duties?*

A: Curriculum development, mandated to develop curricular and support materials for all levels below university, especially digital support, print, electronic, and teaching/learning aids. Most of this is about preparing teachers to implement what they prepared, face-to-face and online. Collating outside content, but not developing the books themselves, which are from publishers. Developing syllabus design and convening it to the publishers, then vetting the content to ensure alignment to schools.

Q: *How long does this process take?*

A: There are 9 steps in the curriculum cycle: needs assessment (with an eye to teachers, students, and parents, as well as employment), report to stakeholders, policy formulation, curriculum design (subject panels, inclusion of teachers from around the country), creation of curriculum support materials, cost panel and editing, academic board approval, teacher training and pilot, monitoring and evaluation.

Q: *Do you have a specific way to work with refugees which is different?*

A: There is a section at KICD to deal with special problems, which looks at any learning not within the regular school program and nonformal/informal systems. The refugee curriculum is developed not with exams, but specifically with refugees, and with a designated specialist who works closely with refugee groups.

Q: *Do you have a specific way to work with refugees which is different?*

A: There is a section at KICD to deal with special problems, which looks at any learning not within the regular school program and nonformal/informal systems. The refugee curriculum is developed not with exams, but specifically with refugees, and with a designated specialist who works closely with refugee groups. For refugee learners with special needs, existing content can also be adapted, and digital content is used to assist these students.

Q: *What are the biggest challenges in working on curriculum for the refugee context?*

A: The context must be evaluated first: are they able to access the content? Are teachers trained? Do they have the skills? What will apply to them--digital, radio/TV, interactive? There are also many external constraints: nomadic communities, for instance, must move often, which can interrupt programs. The language barrier, learning facilities, and resources are also a constraint. How can they learn digitally if the infrastructure isn't there?

Initial Brainstorming

Following these interviews, groups recongregated to discuss potential areas of concern and intervention they saw in the processes, needs, and workflows described here.

Working together, they generated sets of challenges that conformed to the formulation "How might we…" some of which included:

- How might we enable curators to more easily discover content items that can be organized into learning pathways within a curricular structure?
- How might we balance manual and automated techniques to find content items?
- How might we leverage teacher discussion and reflection?
- How might we enable new created content by teachers/coaches to be saved to their desired channels?
- How might we enable platforms to determine possible career subjects for students based on their interactions?
- How might we better describe curricular needs in ways communicable through metadata between different platforms?

Ideation Inventory

Participants then spontaneously generated dozens of ideas based on the results of their challenge statements, using different colors of post-its: yellow to denote ideas that had been tried and had shown promise previously, red to denote ideas that had been tried and had *not* shown promise previously, and green to denote ideas that were new and had not been formerly tried.

Voting on Project Areas

Participants' lists of ideas were then clustered into broad categories of problems, each of which was given a label and described in a few words. These categories ranged across all manner of possible interventions, from teacher training to automated algorithmic solutions. **Altogether, 21 broad categories of ideas emerged from this clustering exercise, featuring hundreds of ideas on the subject.**
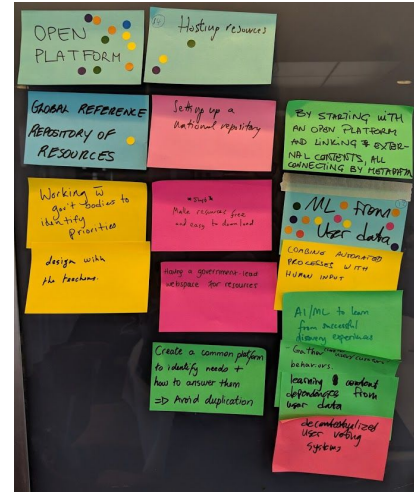
Participants received a set of dot stickers with which to vote on the most compelling ideas. The five major project areas detailed at the start of this report emerged as winners, and formed the composition of the five Paris groups listed in the Outcomes section.

Collaborative Ideation

In order to begin their projects, participants then self-selected into the groups they found most compelling, and ideated together by drawing, sketching, and diagramming their ideas for solutions to the central problem area set within their group.

They then rotated their drawings around the circle and annotated, commented, added to, and otherwise built upon one another's work.

OUTCOMES

METADATA

Majd Al-Shihabi, Dr. Tom Baker, Shivi Chandra, Dr. Lisa Petrides, Dr. Stephan Schindehette, Mahmoud Wardeh

This team investigated a three-pronged approach to incentivize the collection of valuable metadata for educators: a) a way for users to construct searches that take contextual metadata into account, b) an interface design to display search results that may or may not satisfy these criteria, and c) a workflow to gather missing metadata on these results through tying validation to bookmarking.

Project

Capture valuable contextual metadata through a three-pronged, design-based approach targeting users' bookmarking workflow and search habits.

Encouraging users to construct searches that take contextual metadata into account through a search configuration screen encouraging reflection on how the material will be used.

Displaying search results that may or may not satisfy these criteria--in addition to those which do--in order to expose users to a broader subset of content, using a circular matching display that indicates query strength.

Gathering the missing metadata on these "grey area" content items by making validation part of the content-saving process, displaying tags on content cards for easy-click validation.

FOR: "Lesson choosers"--educators, curriculum designers, or self-directed learners

TO ASSIST WITH: Assessing the desirability of educational content search results

Challenge

Teachers need access to content relevant to the unique needs of their students, and its discovery is influenced by the metadata available for searching. Metadata is hard to capture in any case, but contextual metadata, detailing how content is used, is even harder, as users often don't respond well to "feedback forms" or having their workflow disrupted. How do we incentivize users to add metadata to content items, so that the right ones can be discovered by all?

Issues

- **Technical assumptions.** Our solution assumes a central ontology for education-related metadata, and one which many different stakeholders can agree on using for communication between many different bodies of content items. We also assume that our solution design and understanding of how tags proliferate will have applicability across multiple language groups.
- **User assumptions.** We assume an entity called the "lesson chooser" who will be able to envision various types of lesson planning needs and be able to assess the suitability for all of them, likely an educator but in the best-case scenario a curriculum designer.
- **Implementation and context assumptions.** We assume that there is an intermediary stage during which someone is narrowing down an unmediated content library before individual lesson planners or self-directed learners interact with it.

Next steps

We'd like to test design mockups of our workflow on select users, with a test library of content, in order to evaluate our assumptions about which metadata is most useful. This will enable us to focus solely on 3-6 categories of tags for the initial implementation, and refine the workflow accordingly with this select set deemed most high-value for discoverability.

STANDARDS & CURRICULUM

Safaa El-Ouafi, Dr. Joe Karaganis, Flora Michti, Judy Muriuki, Dr. Ivan Savov

A clearly defined curriculum standard of the host country is and essential prerequisite for both manual and semi-automated content-to-curriculum alignment processes. Our group chose to focus on this task by discussing digitization of curriculum standards, taxonomies, and finding commonalities and alignments between different curriculum standards.

Project

Align curricular standards, rather than content items, through a semi-automated method using pairwise alignment of objectives, and a common taxonomy for outcomes across curricula.

Digitize curriculum standards and import into system.

Develop a prototype for finding commonalities across learning outcomes in national curricula, based on text similarity and other metadata.

Import content aligned to curricular objective identified within common taxonomy, taking a learning outcome-based rather than subject-based approach to alignment.

FOR: curriculum mappers and developers

TO ASSIST WITH: moving content that has already been aligned to one national curriculum to another
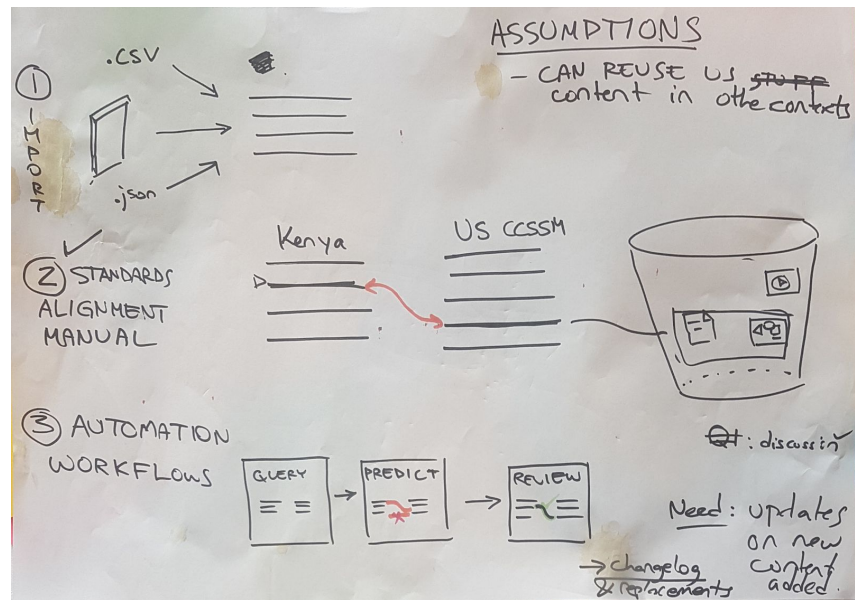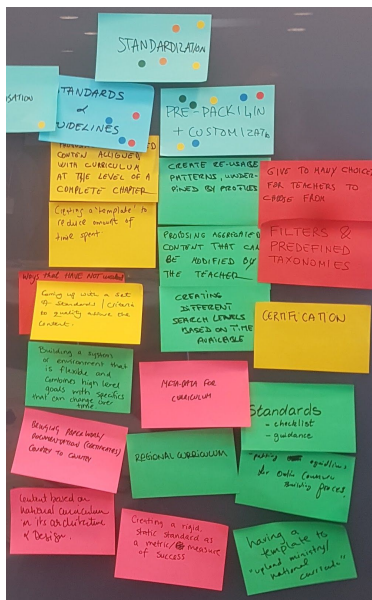
Challenge

How can we align content designed for the curriculum of one country to the curriculum of another country? Through interviews, we identified the need for a method for curriculum digitization and annotation (data entry), a system that aligns competencies/learning outcomes across curricula, a glossary for content mappers and teachers with terminology translations, and automated processes that save time in exposing relevant content to stakeholders.

Issues

- **Technical assumptions.** Curricular standards are appropriately digitized, and a large content library has previously been matched to at least one curricular standard.
- **User assumptions.** Involvement of qualified personnel to conduct the initial digitization of curriculum and approve the matches between standards suggested by the algorithm.
- **Implementation and context assumptions.** Existence and ability to define "universal learning outcomes" that match significantly across curricula, and across different types of subject curricula, along with funding and official ministry endorsement for this work.

Next steps

Select next steps include the preparation of test curricula: legacy curriculum documents must be digitized and imported into the system, and a prototype for finding commonalities across learning outcomes created. Content sources already aligned to country curricula must also be imported.

On the technical side, the proof-of-concept data model created on Notion will be extended to provide recommendations based on keywords and text similarity metrics. The standards alignment system will expose APIs for data import/export and integration with other systems. A separate "editor interface" will be used to browse, annotate, and align curricular standards.

OPEN PLATFORMS

Dr. Jamie Alexandre, Pablo Soler, Dr. Peter Kraker, Zev Lowe, Stéphane Moutier, Ruba Al-Omari, Dr. Nouh Alhindawi, Carlton Chu

Grouping materials into student-specific learning pathways can reduce time needed for formal curricular alignment. This project helps teachers quickly match open learning resources to learning objectives to support the activities of a classroom period, by providing a) a near-instant lesson plan tailored to learner needs and b) a way for teachers to identify specific gaps in these learning pathways to find appropriate content.

Project

Make use of learner data to recommend learning pathways for students at different levels to meet a specific learning objective, providing a near-instant lesson plan that is tailored to learner needs and helps to identify curriculum gaps a teacher can fill.

Recommender system should provide different options for students by level/background.

Teachers can customize and adapt learning pathways, and are prompted to fill in gaps within them.

In the future, teachers will be able to document and share activities, creating new learning resources to benefit other educators.

FOR: educators

TO ASSIST WITH: finding content for the needs of a specific lesson plan and learning objective
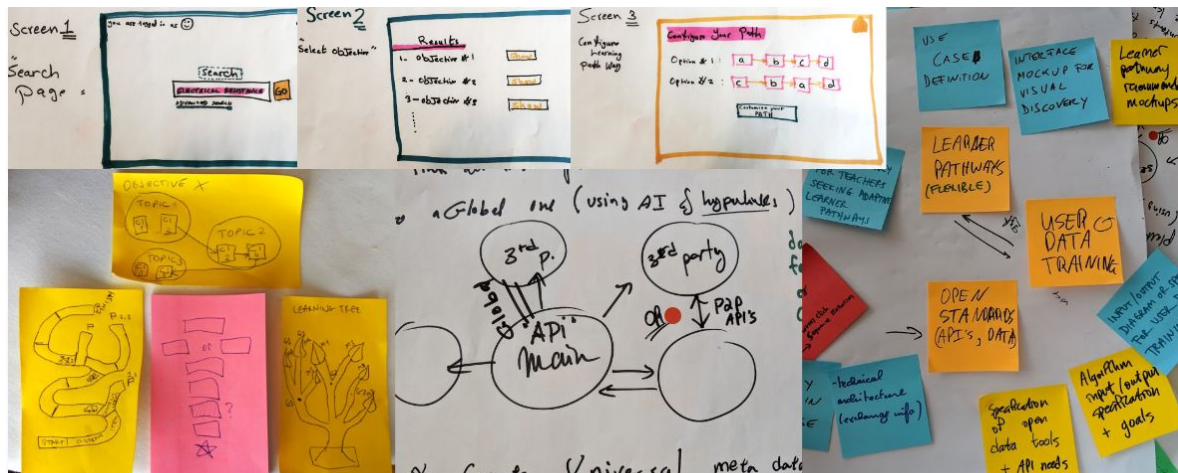
Challenge

Especially in refugee camps, students and teachers come from diverse backgrounds and educational levels. Teachers have limited preparation time and serve large class sizes, and students have limited access to technology-enabled classrooms for direct access to open learning resources. A large number of open educational materials are available for some topics, and in some cases they are roughly aligned to curricular standards. However, these materials are often not grouped into student-specific learning pathways, making it difficult to support students in achieving their learning objectives.

Issues

- **Technical assumptions.** Existence of initially scaffolded predefined pathways to bootstrap system, and student assessment data available to train the AI, especially in environments with poor connectivity where syncing capability of data is limited. Open API's to support interoperability, to share content and data across platforms in order to gather sufficient training data, being sure aggregate in careful ways to protect user privacy.
- **User assumptions.** Teachers will be able to determine the learning objectives for their classes, and will be open to using different learning pathways for students.
- **Implementation and context assumptions.** Ability to scale to critical mass of teachers/countries and maintain the system/standard enough to feed it with data.

Next steps

We'll need to create predefined learning pathways to scaffold the system, e.g. in Kenya, where mapping of open learning resources to the curriculum have been done. From there, we'll be ready to build an MVP, pilot with a small group of teachers in a refugee context, and iterate.

EVALUATION & ASSESSMENT

Jessica Aceret, Nagi Ghorra, Wanjira Kinuthia, Lisa Liskovoi, Lisa Neddam, Elisa Orbananos, Charley Wright

This project focused on creating a feedback system that could generate data for intelligent recommendations for teachers, based on previous content usage and engagement. The project would integrate feedback from teachers, students, and platform analytics by incentivizing different stakeholders to provide feedback in differing ways.

Project

Use a feedback system combining feedback from teachers, students, and platform analytics to provide intelligent recommendations.

Uses qualitative and quantitative data to collect evaluative data on different content sources, based on how it has performed for students and teachers.

Motivates different stakeholders to provide feedback through gamification mechanisms for students, and access to other teachers' feedback for teachers.

AI-based aggregation of the feedback gathered to provide detailed recommendations.

FOR: Students, teachers, parents, curriculum aligners, content creators

TO ASSIST WITH: evaluating suitability of content previously used elsewhere
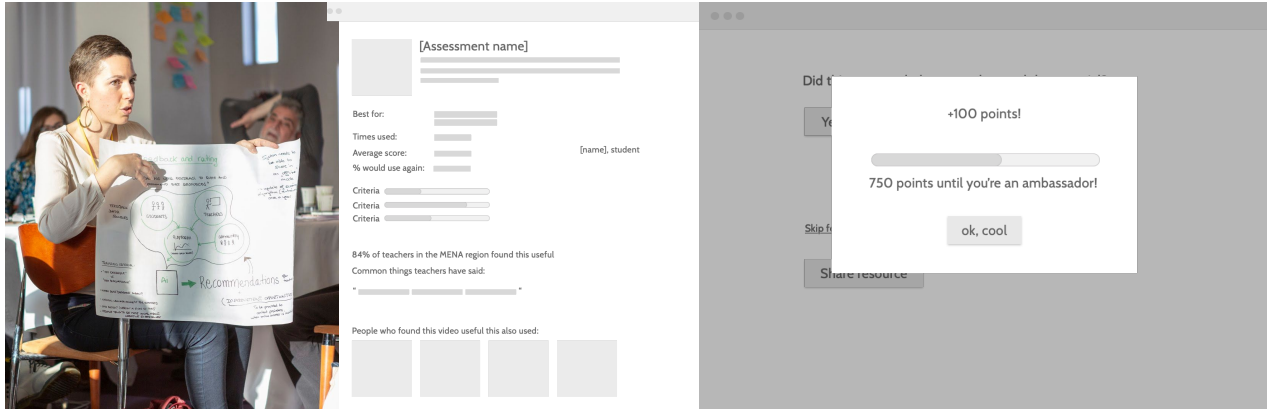
Challenge

Evaluating the utility of any given content source is at the core of alignment, and assessing the quality of automatically-mediated recommendations can be even more time-consuming and difficult. Feedback and rating systems can provide a valuable component of human review, using qualitative feedback and rating systems to provide more nuanced, comprehensive, and holistic recommendations. However, implementing such systems in the context of partially offline, distributed platforms presents additional challenges, including incentivizing different stakeholders to provide feedback and integrating the feedback into a recommender system within an interface.

Issues

- **Technical assumptions.** Each content item has a unique ID even when shared across different platforms, and the AI that analyzes their data will be hosted on a third-party hub which collects, stores, and analyzes the data.
- **User assumptions.** Teachers and students will be incentivized to contribute with the motivations provided, and this motivation will be conducted without biasing data inputs.
- **Implementation and context assumptions.** After training the algorithm, there is the ability to conduct scoring in an offline environment.

Next steps

Storyboards mocking up the sample feedback collection mechanisms and interfaces were created at the sprint, so next steps would include the further refinement and testing of these products, as well as integration with a proof-of-concept once technical requirements are also fulfilled.

TEACHER TRAINING

Olly Farshi, Emeline Marchois, Dr. Dominic Orr, Dr. Gihan Osman, Leticia De Rato Salazar-Simpson, Dr. Richard Tibbles

This project supports and enhances the existing practices of face-to-face teacher discussions, focusing on reflective practice and using content items as the focal point of discussions. It then provides a system and interface to capture these discussions in the form of specific curricular recommendations for making use of content items.

Project

Provide powerful recommendations for content usage by leveraging existing practices of face-to-face teacher discussions, and showcasing these within the content browsing interface

Present "recommendation containers" within the browsing interface, containing other teachers' responses to pre-defined questions.

Provide opportunities for teachers to reply to, annotate, contest, or further discuss recommendations.

Recommendation system based on upvotes/liking, not downvoting, with offline discussion cached and archived.

FOR: educators

TO ASSIST WITH: understanding how others have used content and what its application within a curriculum might be
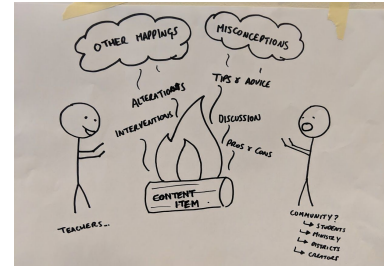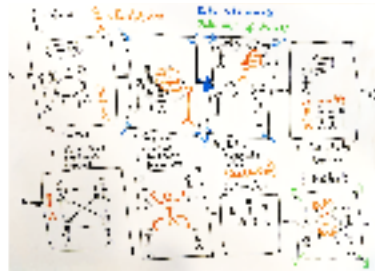
Challenge

Teachers in low-resource and low-bandwidth environments need to improve their content-specific pedagogical knowledge and general teaching practice. One way to do this is by engaging with other teachers, and learning from their experience, on order to improve the quality of lessons for students. However, content (particularly as available for perusal to align to a curriculum) is often in a silo, with critical reflective input on its use from peers missing.

Issues

- **Technical assumptions.** Platform-agnostic mechanism to maximize potential community size, and to encourage references to materials hosted by different platform. Use of text-mining and NLP of comments, in order to provide user-generated categories and metadata. After offline use, ability to sync back offline discussions and compatibility between online and offline archives.
- **User assumptions.** Teachers have basic digital competency and pedagogical training, as well as support from more experienced teachers or other facilitators, and awareness around issues using materials found on the web and key sites for finding and downloading OER.
- **Implementation and context assumptions.** Learning environment offers basic and minimal access to technology use (electricity or alternatives) as well as access to devices.

Next steps

Initial next steps can be divided into three phases. During the first, action research on search strategies, experienced teachers searching for information can be shadowed and asked to verbalize their search process. In the second, mock-ups of a prototype will be tested through walkthroughs. In the third, the planned recommendation containers will be "pre-filled" by teachers in training and subject matter experts.

Kakuma Team

Aluong Agok, Gabriel Anyang, Byaruhanga Nestori, Jayson Akilimali Mushagalusa

This project focused on opportunities for teachers to upload locally-produced explanatory videos for specific subjects/topics to support their lessons, and to fill in gaps in the curriculum. The team explored the types of videos that might be created, plotted out a process for their sustainable creation and addition, and created a sample video to illustrate the potential.

Project

Support teachers to produce and upload locally-generated materials to support their lessons and fill in gaps in the existing curriculum.

Outline of a process for teachers and coaches to upload video content into a given curriculum.

Sample video created with a simple smartphone, lasting for 2 minutes. It demonstrated how to provide small explanations.

Identification of further questions to be answered in the development of these locally-created processes and products.

FOR: educators

TO ASSIST WITH: uploading local explanatory videos on certain subjects to facilitate content mastery

Challenge

The team focused on the challenges posed by student navigation on platforms and the discovery of appropriate materials. The coaches were interested in providing opportunities to add their own materials, particularly within specific grade levels and subjects. Using the most pressing materials of interest observed--local explanatory videos on science subjects--the project explored ways to develop an easy process to facilitate this.

Issues

- **Technical assumptions.** Should videos be shot during class time or are they better filmed close up at a different time then class? How long should they be to hold student attention? Who would tag the videos to ensure they can be best found on platforms like Kolibri, and to aid alignment to national curricula standards?
- **User assumptions.** It will be important to engage the teachers and users early in deciding what content should be prioritized for inclusion as a video. How can teachers be involved in ensuring awareness about the local content? Could students be supported to created videos as part of their class assignments?
- **Context assumptions.** Video filming concerns (e.g., using phones to capture video is challenging in Kakuma because of the wind). Another area of interest was whether it matters where the content is shot--does it matter to users that it is in Kakuma, or is the location not as important?

Next steps

The team intends to survey other teachers and community members on what types of video content they would recommend, and their needs for environments for high-quality filming and production. Team members and co-designers may also work to refine and test the user journey prepared below, formulated during the sprint:

COACH	TEACHER
- Researching of the identified video to be uploaded into the server - Shoot the video during the teacher's lesson - Editing and compressing the video - Ensuring that the camera used for video shooting are properly handled and kept safely - Creating awareness for the existing local contents.	- Providing consent for the video to be shot and uploaded into the server for public viewing - Mobilizing students/learners to cooperate during video shooting - Mapping out the content for the uploads.

Additional next steps included exploring the possibility of AI-driven enhancements to videos, such as subtitles autogenerated and translated into different languages.

NEXT STEPS

At the end of the sprint, participants' reflections were gathered via Mentimeter WordCloud:

In this spirit, we hope to continue taking forward the wonderful ideas, projects, discussions, and collaborations germinated during the sprint. To that end, we'll be undertaking the following program of activities over the coming months:

- **Project prototyping.** The Learning Equality and UNHCR teams, with the assistance of other volunteers, contractors, and co-designers, will begin exploring how to share some of the outputs and prototypes from the sprint as public goods. All outputs, including research, are licensed openly and available for participants' use.
- **Second round sprint.** The second sprint, focusing on actioning specific next steps of some of these projects, will be taking place during the first week of September 2019 in San Francisco. Returning and new participants will be welcome.
- **Remote sprint consultation.** As several organizations and participants had expressed interest in being informed but were not able to attend, we'll be holding remote sessions to keep others abreast of the work before the next sprint.

We'd also like to invite participants to continue to make use of the full set of sprint resources, including:

- Final sprint reports and presentations.
- Prior research and findings.
- Participant collaboration list and sprint Slack channel.

ANNEX

Annex 1: Background

This design sprint built on Learning Equality, UNHCR, and Google.org's existing research and consultative activities intended to facilitate an understanding of the entire ecosystem of digital curriculum projects, including:

- [Consultation](#) on needs for educational platforms in emergency and crisis contexts at UNESCO Mobile Learning Week in 2017.
- [Consultation](#) on needed characteristics for Arabic-language open digital content at the 2017 WISE Summit.
- Consultation on the process of what curriculum alignment entails (including whether the alignment of specific types of content could or should be automated) to inform automation at UNESCO Mobile Learning Week 2018.
- Lessons from the process of alignment of OER to the Kenyan curriculum at the lower secondary level focused on in STEM and life skills, as well as alignment work done using Kolibri Studio by implementers of Kolibri such as in The Gambia, Tanzania, and South Africa.
- Design sessions in Kakuma refugee camp with teachers and coaches aimed to help understand how users new to an educational platform explore and browse through content, and what drives them to engage with digital material, whether for lesson planning, academic work, or extracurricular interests.
- Lessons from Learning Equality's training on use of OER in blended learning settings in refugee and emergency contexts, including Kenya and Jordan.

Annex 2: Sprint Common Reference Glossary

We've shared here a common vocabulary developed for the purpose of this design sprint. Though we recognize that there may not be full agreement on these terms and the varying levels of technicality in how these terms are used, we'd like to ensure that everyone can participate with a common frame of reference of the purposes of this project.

Curricular structure: A set of learning objectives presented as a structure (e.g. a hierarchy of topics, a dependency map, or a simple sequence), oriented towards a particular audience or purpose. Some dimensions of categorization may include:
- time ("Year 12 curriculum")
- age group or educational level ("Secondary school curriculum")
- preparation for a specific objective ("Vocational certification curriculum")
- development in a general area ("Early literacy curriculum")
- sequence of tasks to achieve something ("Junior secondary exit curriculum")
- progression in accordance with mandated achievement compliance ("X National Standards curriculum")

These dimensions are used to structure the duration of teaching for educators, determine areas of study for independent learners, measure achievement by authorities, and organize diverse learning content into a common frame of reference (also referred to as scaffolded learning). A curriculum *does not mandate* how something is taught, only that something must be taught; in any given curriculum, many unique lesson plans are possible.

Learning objective: The intended cognitive state of a learner after engagement with a learning experience, what does a learner now believe/understand/think/feel etc. that they did not before? These can be specific to a learning session, or general over a whole course or curriculum. Curriculum standards are often examples of learning objectives, as are lesson plan goals.

Content item: An individual unit of content (i.e., not a set of *linked* items, such as a course) that could be used to help learn a concept or skill - it may be a segment of text that explains a particular concept, a video that illustrates a skill, an exercise that tests your knowledge of a skill or concept, and more. Note that many educators may differ on the granularity of these units, and how 'small' a content item actually is (or should be). Sometimes described as a "learning object."

Alignment: A judgment about the suitability of individual content items (given an appropriate pedagogical method) to assist in achieving particular learning objectives within a given curriculum structure.

> **Linkage:** An single association between a particular content item and a particular learning objective.
> **Linkage set:** A collection of linkages that collectively form the alignment.

Sequencing: The order of presentation or suggested steps for content items in order for learners to achieve a particular learning objective - this may be constructed by e.g. an instructional designer, classroom teacher, creator of content, self-guided learners, or even the algorithms of personalization platforms.

Annex 3: Feedback during the design sprint (via Mentimeter)

What should we do next:

- Focus and limit the scope
- Try building some of these things together in our own projects
- Join the projects into a mega-project
- to vote and go deeper to a project, getting a MVP
- Recruit a dedicated team to further explain these ideas
- Sleep on it
- Vote on which proposals we should build.
- Perform another iteration on all projects with a 2-week timescale
- Find overlaps between solutions and create connections
- Get cracking
- Think about how all the components created can fit into a single open source platform

- Identify rationale for the product: define profile of users and limitations
- Do not give up
- action plan
- Ideas Analysis
- Select one idea and start working on
- Validate prototypes
- More research with teachers and students
- Build :all-the-things
- Work towards its implementation
- Keep learning and sharing ProFuturo Foundation
- Asses viability and impact of each idea. Pick one. Define MVP. Iterate. Execute.
- Follow up on all the ideas that have come through during the workshop & get started on what is workable
- Cross the streams

How would you like to be involved:

- Explore application of knowledge maps - Peter
- I would like to be involved in the project in terms design and piloting - Gihan
- Design and build some of the tools and algorithms, within Learning Equality's projects and integrating with other projects -Jamie
- To build a MVP and integrate with a core system_pablo
- Anything design/frontend - Jessica
- Possible cross-platform work with OER Commons -LisaP
- Help set specification and advice on the recommendation system. - Carlton Chu
- Build a proof of concept for the project with real data
- Action research (Dominic)
- Metadata selection and vocabulary construction (Stephan)
- Provide user input and feedback.
- Testing offline solutions in refugee context - Nagi
- Support when it comes to populating the 'platform' with content, materials and on building a multilingual community of practice - Emeline
- From JRS we could help matching / validating the ideas or further creations as education implementing partners in other refugee contexts other than Kakuma (Elisa)
- Designing and investigating areas where curriculum alignment can be hosted (Flora)
- Designing and applying -Ruba
- Can participate in designing and implementing the project - Dr. Nouh Alhindawi
- Help with connecting with collaborators. Integration design (eg xAPI) - Mahmoud Wardeh
- Prototyping and building -Richard
- Exploring potential collaboration with UNESCO @ValMMendes
- Building and sharing (Leticia)
- Design consultancy (Olly)
- Help include more users with diverse needs through research and design (Lisa L)
- I would like to be involved in the next steps, moving forward especially in matters curriculum or teacher training or evaluation. Judy
- Higher ed OER applications - Joe